

**REMARKS**

The Final Office Action indicated that the subject matter of Claims 3, 4 and 14 would be allowed if rewritten in independent form.

In this regard, newly drafted Claim 22 corresponds to the indicated allowed subject matter of dependent Claim 4. New independent Claim 23 corresponds to the indicated allowed subject matter of dependent Claim 3 and newly drafted independent Claim 24 corresponds to the indicated allowed subject matter set forth previously in dependent Claim 14 and described in the comments in the Final Office Action rejection on Pages 6 and 7. Thus, it is believed that these claims are allowable.

The present invention is directed to improvements in a specific cathode structure that can be used, for example, in an electron gun of a very compact configuration, to both improve the heating of electron emitting material while addressing the consequences of evaporation of the electron emitted material over a long period of use that can cause a short circuit between electronic leads of a heating wire, and the surrounding metallic supporting structure.

The present invention not only uniquely provides a cathode structure of an improved compact configuration, but further increases a spatial distance that any evaporated electron emitting material would have to travel while ensuring that electron leads extend in a direction away from the desired directional emission of the electrons.

Reference can be made to our Figures 8A-D for disclosing a configuration of a heating wire in a forming frame or mold 24. Reference can also be made to Figures 10A and 10B that discloses a forming step where, for example, an electric insulating body made from an alumina powder permits the heating wire to be partially buried with the lead wires extending from the

electric insulating material. The heating wire is in direct contact with the electric insulating material.

As can be readily appreciated, different configurations of an electric insulating material body are provided as seen, for example, in Figures 12A-12E. As described repetitively through our specification, the electric lead wires emerge or lead out of a side surface or bottom surface of the electric insulating material body. Our drawings and description clearly disclose that our heating wire is not only partially buried in the sense of a dictionary definition of covered with, e.g. dirt on a grave, but also embedded and in contact with the electric insulating material body.

The Advisory Action contended that the term “burying” could be broadly construed so that “the wire is not necessarily in contact with the electric insulating material body,” yet our specification and drawing support our definition of “partially buried.”

However, applicant has, amended the specification in a manner that is believed to remove the broad reliance on either the *Held* (U.S. Patent No. 3,652,894) or *Yamamoto et al.* (U.S. Patent No. 6,300,711).

Claims 1, 2, 5-9 and 16 were rejected under §102 as being anticipated by U.S. Patent No. 3,652,894 (“Held”).

*Held* does not disclose a columnar electric insulating material body (FIG. 1, item 7) and a heater (FIG. 1, item 6) embedded in a second end of the body nor is it in direct contact with the insulating material body. *Held* reveals that heater 6 is not embedded in body 7.

*Held*’s item 7 is in fact an open-ended hollow cylinder. *See Held*, FIGS. 1-2 and col. 2 ln. 15-18. The volume (item 3) within item 7 is defined as a “cavity.” *Id.* at col. 1, ln. 65 and does not teach an “insulating material body ... filled with an insulator around the heating element.” Final Office Action, p.2. There is no such insulating material in the *Held* structure

because *Held* expressly discloses that heating element 6 is arranged in cavity 3. *Held* col. 1, ln. 63 to col. 2, ln. 7. Therefore, *Held* does not anticipate Claim 1 or Claim 5, each of which expressly claims a heating wire partially buried in the electric insulating material body.

“Thus when differences that may appear technologically minor nonetheless have a practical impact, particularly in a crowded field, the decision-maker must consider the obviousness of the new structure in this light.”

*Continental Can Co. USA Inc. v. Monsanto Co.*, 20 U.S.P.Q. 2d. 1746, 1752 (Fed. Cir. 1991).

Claims 1, 2, 5-9, 11-13, 16 and 18-20 were rejected under §103 as being unpatentable over U.S. Patent 6,300,711 (“Yamamoto”) in view of *Held*. It is well established in patent law that a claim may be rejected as obvious only where the combination of references teach, *inter alia*, all of the claim limitations. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). *Yamamoto* is also erroneously credited as teaching the claimed limitation of a heating wire partially buried in an electric insulating material body.

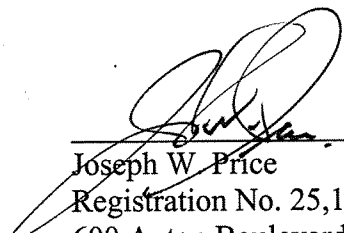
The Final Office Action asserts *Yamamoto* as teaching “a heater 10 embedded in ... the body 11,” and adding an erroneous statement that “[t]he body is filled with an insulator around the heating element.” Final Office Action, p.4. Contrary to these statements, *Yamamoto*’s body 11 is clearly a hollow tubular metal sleeve. *Yamamoto*, col. 2, ln. 37-38. It is clearly not filled with insulating material, and therefore *Yamamoto* in view of *Held* cannot be credited with teaching a columnar electric insulating material body, as claimed in Claims 1, 5 and 20. *See also*, *Yamamoto*, col. 3, ln. 12-41 and FIGS. 3A to 3C, which describe how *Yamamoto*’s tubular metal sleeve 11 is manufactured as a hollow metal tube. Moreover, due to the absence of insulating material within sleeve 11, *Yamamoto* in view of *Held* cannot be fairly credited as teaching a heating wire partially buried in the insulating body, as claimed in Claims 1 and 5.

It is believed that the application is now in condition for allowance and that applicant's improvement in this relatively crowded field should be properly interpreted in view of the current claim language. It is believed that the case is in condition for allowance.

If the Examiner believes that a telephone interview will assist in the prosecution of the case, the undersigned attorney can be contacted at the listed telephone number.

Very truly yours,

**SNELL & WILMER L.L.P.**



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